

Measuring the effectiveness of patient-chosen reminder methods in a private orthodontic practice

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ABSTRACT

Objective: To evaluate the effectiveness of patient-chosen appointment reminder methods (phone call, e-mail, or SMS text) in reducing no-show rates.

Materials and Methods: This was a retrospective case study that determined the correlation between patient-chosen appointment reminder methods and no-show rates in a private orthodontic practice. This study was conducted in a single office location of a multioffice private orthodontic practice using data gathered in 2015. The subjects were patients who self-selected the appointment reminder method (phone call, e-mail, or SMS text). Patient appointment data were collected over a 6-month period. Patient attendance was analyzed with descriptive statistics to determine any significant differences among patient-chosen reminder methods.

Results: There was a total of 1193 appointments with an average no-show rate of 2.43% across the three reminder methods. No statistically significant differences ($P = .569$) were observed in the no-show rates between the three methods: phone call (3.49%), e-mail (2.68%), and SMS text (1.90%).

Conclusions: The electronic appointment reminder methods (SMS text and e-mail) had lower no-show rates compared with the phone call method, with SMS text having the lowest no-show rate of 1.90%. However, since no significant differences were observed between the three patient-chosen reminder methods, providers may want to allow patients to choose their reminder method to decrease no-shows. (*Angle Orthod.* 2018;88:314–318.)

KEY WORDS: No-shows; Reminders; Appointment; Nonattendance

INTRODUCTION

Appointment No-shows

In many areas of health care, providers face the challenge of patients not attending their scheduled appointments. The number of appointments that

patients do not attend compared with the total number of scheduled appointments is the “no-show rate.” This term is synonymous with “nonattendance rate,”^{1–5} “missed appointment,”^{6–8} and “failed appointment.”^{9,10}

Research conducted on no-show rates has reported negative effects resulting therefrom. Patients who do not attend appointments or maintain a regular schedule can have a less desirable treatment outcome,¹¹ including reduced quality of care¹² and inconsistent continuity of care.¹ Irregular attendance can also be related to a higher rate of emergencies and less compliance with health-care providers’ instructions.¹³ Patients can be subjected to longer wait times if an office consequently overbooks their schedule and more patients attend than anticipated.² Missed orthodontic appointments can result in longer treatment times, inconsistent appliance adjustments, and less effective and efficient treatment outcomes. Besides the negative financial impact of patient no-shows from the increased cost of care^{2,14} and revenue loss,^{2,10,15} office resources, such as additional staff time for rescheduling missed appointments, are often wasted.^{1–3,10,14–17}

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Patients commonly cite forgetting the appointment as a reason for no-show,^{4,9,18} and a wide variety of reminder methods have been investigated to determine their effects on lowering the no-show rate, including paper mail, phone calls made by staff, automated phone calls, e-mails, and short message service (SMS) texts.

No-shows in Medical Clinics

Various studies have been conducted to investigate the effectiveness of reminder methods in various health-care fields. Parikh et al.¹⁶ published a study involving an outpatient, multispecialty, academic medical clinic. They compared three different assigned groups: telephone calls, automated calls, and no reminder, concluding that the telephone calls were more effective in reducing the no-show rate than were automated calls.

Perron et al.⁶ compared text messages and telephone calls as reminder methods in academic primary-care units and substance abuse clinics with assigned reminders of either SMS text or telephone call, concluding similar no-show rates for the two reminder methods.

Comparing the SMS text reminder with a no-reminder method, Youssef et al.¹⁹ used a larger sample of patients from three hospital specialty clinics: general medicine, neurology, and obstetrics/gynecology (OB/GYN). Findings concluded a significant decrease in no-shows by 10.3% (from 36.4% to 26.1%) when the SMS text reminder method was used compared with no-reminder. However, when the OB/GYN clinic was excluded from the analysis, the SMS text reminder method reduced the no-show rate to 14.5% (from 41.6% to 27.1%). This study noted the importance of considering the clinic type and concluded that the success of appointment reminder methods may be dependent upon the type of care being provided.

No-shows in Dental Clinics

Nelson et al.¹⁴ compared randomly assigned cell phone calls with SMS text messages in a pediatric, nonacademic dental office and found that patients receiving SMS text messages had over twice as many no-shows. This study suggested that further research should be done in a nonacademic setting.

Reekie and Devlin⁹ conducted a study in a single general dentist's office. They placed patients into groups for no reminder, postcard, telephone call made by staff, automated call, or a combination of post card and automated call. If the automated call did not reach the intended party, there was a follow-up manual call. The study concluded that the no-appointment reminder resulted in over three times as many no-shows, with no

significant difference among the four reminder groups. Bos et al.¹⁰ did a replication study of Reekie and Devlin's research.⁹ The differences were in the patient population and reminder methods. This study was conducted in an academic orthodontic clinic, comparing no-show rates of mail, telephone call, SMS text, and no-reminder. They concluded that there was no difference between the three reminder methods and the no-reminder option.

Patient Preferences

When considering reminder methods for each patient, these investigators have assigned the reminder method to each patient without considering patient preference. Nelson et al.¹⁴ recommended allowing patients to choose the appointment reminder method to reduce no-show rates. Finkelstein et al.¹⁶ investigated patient preferences for appointment reminder types in a primary care clinic. Results showed that cell phone calls were the most preferred reminder method, followed by home phone calls and SMS texts. Direct mail and e-mail were both considered least preferred options. Additionally, preferences for more technologically advanced methods of SMS text and e-mail cannot be predicted by age, although age is often used to predict a person's level of comfort with technology.¹⁶ Although cell and home phone calls ranked first and second on the list, respectively, the authors noted that 12.4% of the survey respondents did not have cell phones and 31% did not have home phones. This could mean if a practice assigns one reminder method, that method may not be applicable to a large number of patients. Further research has been recommended with patient-chosen reminder methods to increase their effectiveness.¹⁶

MATERIALS AND METHODS

This study was approved by the Roseman University of Health Sciences Institutional Review Board and was conducted in a single office of a multioffice private orthodontic practice. Data were collected over a 6-month period, from May through November 2015, with a total of 261 patients and 1193 appointments. The patients chose one of three reminder methods: phone call, e-mail, or SMS text. Patients were included if they had at least three appointments within the 6-month time period. Patient appointments for active treatment, placement and removal of appliances, appliance checks, and retention were included in the study. Appointments were not included for emergencies, new patient exams, case discussions, or diagnostic records. Additionally, appointments that were canceled or rescheduled before the appointment time were not considered no-shows. Phone call reminders were

Table 1. No-shows by Appointment

Reminder Method	No-show Appointments, n (%)	Show Appointments, N (%)	Total Appointments, N (%)	P Value (Chi-square Test)
Phone	3 (3.49)	83 (96.51)	86 (100)	0.569
E-mail	17 (2.68)	617 (97.32)	634 (100)	
SMS text	9 (1.90)	464 (98.10)	473 (100)	
Total	29 (2.43)	1164 (97.57)	1193 (100.00)	

considered complete once the calls were answered or voice messages were left. SMS text and e-mail reminders were sent through the practice management software (Cloud 9), which included an option for the recipient to cancel the appointment. However, confirming appointment attendance was not an option. If patients had the opportunity to confirm the appointment, a lower no-show rate might have occurred.

The no-show frequency was determined for each patient-chosen reminder method and for each patient individually. Frequencies of each of the reminder methods and analyses determined any differences between the no-show rate and the reminder methods. The possible contributing factors of appointment duration, appointment start time, and appointment type were further analyzed.

RESULTS

There were 634 appointment reminders by e-mail (53.1%), 473 by SMS text (39.6%), and 86 by phone (7.2%) for a total of 1193 appointments, of which there were 29 (2.43%) no-shows. Table 1 shows the data with the number and percentage of no-shows for each reminder method. The no-show rates were all less than 4%, with telephoning being the highest, e-mailing second, and SMS texting the least—3.49%, 2.68%, and 1.90%, respectively. Based on these results, the patient-chosen reminder methods were not significantly different ($P = .569$).

Patients had between 3 and 12 appointments within a 12-month period, with an average of 4.5 appointments per patient. The greatest proportion of appointments that any one patient missed were two out of four (50%). There was no significant difference between the three methods ($P = .469$), when considering only patients that missed one or more appointments.

Three possible contributing factors were analyzed: duration of appointment, appointment start time, and appointment types. The office scheduled appointments in 15-minute increments, from 15–120 minutes' duration, but duration had no significant effect on the no-show rate ($P = .756$). Nor was there any significant effect of appointment start time (7:00 AM–9:45 AM, designated early morning, 10:00 AM–12:45 PM, midday, and after 1:00 PM, afternoon) on the no-show rate ($P = .284$). Four groups of appointment types were

compared: (1) arch wire changes, detailing, adjustments, Invisalign checks; (2) appliance delivery, bonding; (3) appliance removal, debonding; and (4) impressions. There was no significant effect of appointment type on the no-show rate ($P = .826$).

Six 3-way chi-square tests were analyzed with no-show appointments and the other factors. The only statistical significance was for the combination of appointment duration, appointment type, and no-show appointments ($P < .001$). We noted that one of the most frequently missed appointments in terms of duration and type was the 30-minute appointment for arch wire changes, detailing, adjustments, or Invisalign.

DISCUSSION

A study by Loria²⁰ has reported recent trends of preferences toward electronic appointment reminders. That survey found that the most commonly preferred method overall was SMS text, followed by e-mail, phone call, and direct mail. A dentist from Seattle interviewed in the study believed that the trend toward electronic reminders in his practice occurred because they were immediately received once they were sent. The survey found that as age increased (≥ 55 years, baby boomers), the preference for electronic means of communication decreased. Alternatively, preferences for contacting someone from a younger age group (18–24 years, millennials) to remind them of appointments by phone and direct mail were the least common. Forty-one percent of millennials reported SMS text as the highest preferred method vs 22% of baby boomers. The conclusion from this recent 2015 study²⁰ was that patients chose SMS texts and e-mails more frequently as reminder methods.

The current study had lower no-show rates than did other medical and dental studies. However, there was no significant difference among the no-show rates of the three reminder methods, which indicates that the reminder method does not affect the no-show rate when patients choose their own method. This was similar to the study by Reekie and Devlin⁹ concluding that the type of reminder did not affect no-show rates. Perron et al.⁶ supported the findings of the current study, concluding that text messages were as effective as telephone calls to reduce no-show rates. In the

Table 2. No-show Appointments by Type

Appointment Type	No-show Appointments, n (%)	Show Appointments, n (%)	Total Appointments, n (%)	P Value (Chi-square Test)
Checks	4 (0.34)	174 (14.59)	178 (14.92)	0.826
Arch wire changes, detailing, adjustments, Invisalign checks	21 (1.76)	671 (56.24)	692 (58.01)	
Appliance delivery, bonding	2 (0.17)	232 (19.45)	234 (19.61)	
Appliance removal, debonding	2 (0.17)	55 (4.61)	57 (4.78)	
Impressions	0 (0)	32 (2.68)	32 (2.68)	
Total	29 (2.43)	1164 (97.57)	1193 (100.00)	

Perron et al.⁶ study, two phone call attempts were made before a message was left. In the current study, if no one answered, a message was left on the first attempt.

Results from the current study differed from those of Nelson et al.,¹⁴ which concluded that SMS text messages (no-show rate, 17.7%) were not as effective as voice messages (no-show rate, 8.2%) in a pediatric academic clinic. The current study ranked reminder preferences as e-mail, 53.6%; SMS text, 38.3%; and phone call, 8%. However, in the Nelson et al. study, more participants preferred phone call (41%) than they did SMS text message (27%). The impact of the self-selected appointment reminder method on nonattendance was recommended for future research.

The patient's primary contact that receives appointment reminders could have an effect on attendance. A limitation of this study was the lack of control over the person receiving an appointment reminder and the person bringing the patient to the appointment. The relationship of the primary contact to the patient could not be identified and therefore could be an area for future research.

Although there was no significant association between the possible contributing factors analyzed and the reminder methods, some important observations of clinical relevance were made. Early morning appointments (7:00 AM–9:45 AM) had the highest percentage of all the no-shows, at 48.3%. The 30-minute appointments, which were the most commonly scheduled for arch wire changes, detailing, adjustments, and Invisalign checks, were the appointments with the highest total no-shows, for both appointment duration (30 minutes), at 82.8% of all no-shows, and appointment type (arch wire changes, detailing, adjustments, and Invisalign checks), at 72.4% of all no-shows.

Of the five groups of appointment types, the lowest number of no-shows were the impressions, appliance delivery, bonding, appliance removal, and debonding (Table 2). The assumption is that these appointments are the most important to the patient, who is either starting or finishing orthodontic treatment.

CONCLUSIONS

- There was no statistically significant difference in no-show rates among the three appointment reminder methods when the patient chose the method.
- Preferences for appointment reminder methods, ranked from most to least preferred in this population of orthodontic patients, were e-mail, SMS text, and phone call, respectively. While e-mail was the most preferred reminder method, SMS text had the lowest no-show rate (1.90%). When considering the type of appointment, appointment duration, and no-shows, the no-show occurrence was highest in the 30-minute appointments for arch wire changes, detailing, adjustments, or Invisalign checks.
- Future research should be done with a larger and more diverse patient population.

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